Ajax FOR DUMMIES®

by Steve Holzner, PhD

Wiley Publishing, Inc.

Ajax
FOR
DUMMIES®

Ajax FOR DUMMIES®

by Steve Holzner, PhD

Wiley Publishing, Inc.

Ajax For Dummies®
Published by
Wiley Publishing, Inc.
111 River Street
Hoboken, NJ 07030-5774
www.wiley.com

Copyright © 2006 by Wiley Publishing, Inc., Indianapolis, Indiana

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Legal Department, Wiley Publishing, Inc., 10475 Crosspoint Blvd., Indianapolis, IN 46256, (317) 572-3447, fax (317) 572-4355, or online at http://www.wiley.com/go/permissions.

Trademarks: Wiley, the Wiley Publishing logo, For Dummies, the Dummies Man logo, A Reference for the Rest of Us!, The Dummies Way, Dummies Daily, The Fun and Easy Way, Dummies.com, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries, and may not be used without written permission. All other trademarks are the property of their respective owners. Wiley Publishing, Inc., is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 800-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

For technical support, please visit www.wiley.com/techsupport.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Control Number: 2005937352

ISBN-13: 978-0-471-78597-2

ISBN-10: 0-471-78597-0

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

1B/QY/QS/QW/IN

About the Author

Steve Holzner is the award-winning author of nearly 100 computer books. His books have sold more than 2 million copies and have been translated into 18 languages around the world. He specializes in online topics, especially Ajax, and he has long done commercial Ajax programming.

Dedication

To Nancy, of course!

Publisher's Acknowledgments

We're proud of this book; please send us your comments through our online registration form located at www.dummies.com/register/.

Some of the people who helped bring this book to market include the following:

Acquisitions, Editorial, and Media Development

Senior Project Editor: Paul Levesque

Acquisitions Editor: Katie Feltman

Copy Editors: Virginia Sanders, Heidi Unger

Technical Editor: Vanessa Williams

Editorial Manager: Leah Cameron

Media Development Specialists: Angela Denny, Kate Jenkins, Steven Kudirka, Kit Malone, Travis Silvers

Media Development Coordinator: Laura Atkinson

Media Project Supervisor: Laura Moss

Media Development Manager: Laura VanWinkle

Media Development Associate Producer: Richard Graves

Editorial Assistant: Amanda Foxworth

Cartoons: Rich Tennant (www.the5thwave.com)

Composition Services

Project Coordinator: Maridee Ennis

Layout and Graphics: Carl Byers, Andrea Dahl, Barbara Moore, Lynsey Osborn

Proofreaders: Leeann Harney, Jessica Kramer, TECHBOOKS Production Services

Indexer: TECHBOOKS Production Services

Special Help

Becky Huehls, Elizabeth Kuball

Publishing and Editorial for Technology Dummies

Richard Swadley, Vice President and Executive Group Publisher

Andy Cummings, Vice President and Publisher

Mary Bednarek, Executive Acquisitions Director

Mary C. Corder, Editorial Director

Publishing for Consumer Dummies

Diane Graves Steele, Vice President and Publisher

Joyce Pepple, Acquisitions Director

Composition Services

Gerry Fahey, Vice President of Production Services

Debbie Stailey, Director of Composition Services

Contents at a Glance

Introduction 1

Part I: Getting Started 7

Chapter 1: Ajax 101 9
Chapter 2: It's All About JavaScript 21

Part II: Programming in Ajax 73

Chapter 3: Getting to Know Ajax 75
Chapter 4: Ajax in Depth 113

Part III: Ajax Frameworks 151

Chapter 5: Introducing Ajax Frameworks 153
Chapter 6: More Powerful Ajax Frameworks 181
Chapter 7: Server-Side Ajax Frameworks 213

Part IV: In-Depth Ajax Power 235

Chapter 8: Handling XML int Ajax Applications 237
Chapter 9: Working with Cascading Style Sheets in Ajax Applications 269
Chapter 10: Working with Ajax and PHP 297

Part V: The Part of Tens 323

Chapter 11: Ten Ajax Design Issues You Should Know About 325
Chapter 12: Ten Super-Useful Ajax Resources 331

Index 337

Table of Contents

Introduction 1

About This Book 1
Conventions Used in This Book 2
Foolish Assumptions 2
How This Book Is Organized 3
Part I: Getting Started 3
Part II: Programming in Ajax 3
Part III: Ajax Frameworks 3
Part IV: In-Depth Ajax Power 4
Part V: The Part of Tens 4
Icons Used in This Book 4
Where to Go from Here 5

Part I: Getting Started 7

Chapter 1: Ajax 101 9

How Does Ajax Work? 10
A user's perspective 10
A developer's perspective 11
What Can You Do with Ajax? 12
Searching in real time with live searches 12
Getting the answer with autocomplete 13
Chatting with friends 14
Dragging and dropping with Ajax 15
Gaming with Ajax 16
Getting instant login feedback 17
Ajax-enabled pop-up menus 18
Modifying Web pages on the fly 19
Google Maps and Ajax 19
When Is Ajax a Good Choice? 20

Chapter 2: It's All About JavaScript 21

Taking a First Look at Ajax in Action 21
Taking a look at the code 23
Delving deeper into JavaScript 24
Enter JavaScript 24
Creating a script 25
Accessing the Web page from JavaScript 26
Oh, those semicolons 28
Adding comments to your JavaScript 28
Using separate script files 29

Examining script errors 30
Which browser are you using? 32
Making Something Happen: Browser Events 33
Putting browser events to work 35
Getting the quotation marks right 36
Dividing and Conquering: JavaScript Functions 37
Understanding the problem 38
Putting together a function 39
Calling the function 40
Passing a single argument to a function 44
Using versus 45
Passing multiple arguments 47
You Must Remember This: Storing Data 48
Simple data storage with the var statement 49
Churning your data with operators 50
Altering a variable's data 55
Storing JavaScript objects in a variable 56
Oh, those functions! 57
Picking and Choosing with the if Statement 59
Using the if statement 59
Using the else statement 61
Determining browser type and version 62
It Just Gets Better: The for Loop 64
Over and Over with the while Loop! 66
Pushing Some Buttons 69
Displaying a message with a button click 69
Reading a text field with a button click 71

Part II: Programming in Ajax 73

Chapter 3: Getting to Know Ajax 75

Writing Some Ajax 76
Creating the XMLHttpRequest object 79
Checking to make sure you have a valid XMLHttpRequest object 83
Opening the XMLHttpRequest object 84
When you're ready: Handling asynchronous downloads 85
You got the data! 88
Deciding on relative versus absolute URLs 90
Other ways of getting XMLHttpRequest objects 91
Interactive Mouseovers Using Ajax 93
Getting Interactive with Server-Side Scripting 94
Choosing a server-side scripting language 95
Connecting to a script on a server 95

Time for Some XML....97
Getting XML from a PHP script....98
Setting up a Web page to read XML....100
Handling the XML you read from the server....101
Extracting data from XML....102
Listing the colors in the drop-down control....104
Passing Data to the Server with GET....106
Passing Data to the Server with POST....109

Chapter 4: Ajax in Depth....113

Returning JavaScript from the Server....114
When do you send back JavaScript from the server?....114
How does returning JavaScript work?....114
Returning a JavaScript object....118
Connecting to Google for a Live Search....120
Handling the data Google sends you....121
Detecting keystrokes....122
Connecting to Google Suggest....123
Showing Google's response....125
Calling a Different Domain....130
Reversing the Roles: Performing Validation on the Server....131
Getting Some Amazing Data with HEAD Requests....134
Returning all the header data you can get....135
Finding the last-modified date....136
Does a URL exist?....139
Finding the Problem: Debugging Ajax....140
Setting up your browser for debugging....140
Debugging with Greasemonkey....142
Overload: Handling Multiple Concurrent Requests....143
Double the fun....144
Packing it all into an array....146
Getting the inside scoop on inner functions....147

Part III: Ajax Frameworks....151

Chapter 5: Introducing Ajax Frameworks....153

A Little More Ajax Power....154
Introducing the Ajax Gold Framework....157
Using GET to get text....158
Using GET to get XML....162
Using POST to post data and get text....166
Using POST to post data and get XML....170
Finding Ajax Frameworks in the Wild....173
Easy Ajax with AJAXLib....174
Grabbing XML with libXmlRequest....176

Chapter 6: More Powerful Ajax Frameworks 181

Dragging and Dropping with Shopping Carts 182
Handling mouse events 185
Handling mouse down events 187
Handling mouse-move events 189
Handling mouse up events 189
Updating the shopping cart 191
Looking at Some Heavier-Weight Frameworks 194
Getting XMLHttpRequest objects with XHConn 194
The Simple AJAX Code Kit: Sack 196
Parsing XML with Interactive Website Framework 198
Handling older browsers with HTMLHttpRequest 199
Decoding XML with Sarissa 201
Creating visual effects with Rico 204
Overcoming caching with the Http framework 211

Chapter 7: Server-Side Ajax Frameworks 213

Writing JavaScript by Using Ajax Frameworks 213
Sajax and PHP 214
Xajax and PHP 218
LibAjax and PHP 221
JPSpan and PHP 224
Accessing Java with Direct Web Remoting 225
Setting up for Java on the Web 225
Connecting to Java by using DWR 225
Building Web Applications with Echo2 228
Handling Ajax and JavaServer Pages with Ajax Tags 229
Handling Java with SWATO 231
Tracking Down the Many Other Frameworks Available 232
Developing amazing applications with WebORB 232
Ruby on Rails 233
Backbase 234
Dojo 234
Atlas.NET 234

Part IV: In-Depth Ajax Power 235

Chapter 8: Handling XML int Ajax Applications 237

Understanding Basic XML 238
What's in a tag? 238
Keeping XML documents well-formed 239
Making an XML document valid 240
Requesting XML Data in Ajax 240

Extracting XML Data Using Properties 243
Right on the node 243
Introducing the JavaScript properties 243
Navigating an XML document using JavaScript properties 245
Extracting with nodeValue 249
Handling white space in Mozilla and Firefox 250
Removing white space in Mozilla and Firefox 254
Accessing XML Elements by Name 258
Accessing Attribute Values in XML Elements 260
Validating XML Documents in Ajax Applications 263

Chapter 9: Working with Cascading Style Sheets in Ajax Applications 269

An Ajax-Driven Menu System 271
Setting up the styles 272
Handling mouse events 277
Displaying a menu 278
Hiding a menu 280
Getting a menu's item from the server 281
Handling the menu items 282
Displaying Text That Gets Noticed 285
Styling text 287
Handling colors and backgrounds 289
Positioning using styles 292

Chapter 10: Working with Ajax and PHP 297

Starting with PHP 298
Getting a Handle on Variables 301
Handling Your Data with Operators 304
Making Choices with the if Statement 306
Round and Round with Loops 307
Handling HTML Controls 310
Getting data from text fields 311
Checking out data from check boxes 312
Tuning in data from radio buttons 314
Sending Data to the Server 316
Reading Files 317
Writing Files 319
Working with Databases 320

Part V: The Part of Tens 323

Chapter 11: Ten Ajax Design Issues You Should Know About 325

Breaking the Back Button and Bookmarks 325
Giving Visual Cues 326
Leaving the User in Control 326

Remembering All the Different Browsers....327
Showing Users When Text Changes....327
Avoiding a Sluggish Browser....328
Handling Sensitive Data....328
Creating a Backup Plan....328
Showing Up in Search Engines....328
Sidestepping a Browser's Cache....329

Chapter 12: Ten Super-Useful Ajax Resources....331

The Original Ajax Page....331
The Ajax Patterns Page....332
The Wikipedia Ajax Page....332
Ajax Matters....332
XMLHttpRequest Object References....333
Ajax Blogs....333
Ajax Examples....334
Ajax Tutorials....334
Ajax Discussion Group....334
More Depth on XMLHttpRequest....335

Index....337

Introduction

Making Web applications look and feel like desktop applications is what this book is all about — that's what Ajax does. Although Web development is getting more and more popular, users still experience the nasty part of having to click a button, wait until a new page loads, click another button, wait until a new page loads, and so on.

That's where Ajax comes in. With Ajax, you communicate with the server behind the scenes, grab the data you want and display it instantly in a Web page — no page refreshes needed, no flickering in the browser, no waiting. That's a big deal, because at last it lets Web applications start to look like desktop applications. With today's faster connections, grabbing data from the server is usually a snap, so Web software can have the same look and feel of software on the user's desktop.

And that, in a nutshell, is going to be the future of Web programming — now the applications in your browser can look and work just like the applications installed on your computer. No wonder Ajax is the hottest topic to come along in years.

About This Book

This book gives you the whole Ajax story, from soup to nuts. It starts with a tour of how Ajax is used today, taking a look at some cutting-edge applications (as well as some games). Then, because Ajax is based on using JavaScript in the browser, there's a chapter on how to use JavaScript (if you already know JavaScript, feel free to skip that material).

Then the book plunges into Ajax itself, creating Ajax applications from scratch, from the beginning level to the most advanced. And you'll see how to put many of the free Ajax *frameworks*, which do the programming for you, to work. Because Ajax also often involves using XML, Cascading Style Sheets (CSS), and server-side programming (using PHP in this book), there's also a chapter on each of these topics.

You can also leaf through this book as you like, rather than having to read it from beginning to end. Like other *For Dummies* books, this one has been designed to let you skip around as much as possible. You don't have to read the chapters in order if you don't want to. This is your book, and Ajax is your oyster.

Conventions Used in This Book

Some books have a dozen dizzying conventions that you need to know before you can even start. Not this one. All you need to know is that new terms are given in italics, like *this*, the first time they're discussed. And that when new lines of code are introduced, they're displayed in bold:

```
function getDataReturnText(url, callback)
{
  var XMLHttpRequestObject = false;

  if (window.XMLHttpRequest) {
    XMLHttpRequestObject = new XMLHttpRequest();
  } else if (window.ActiveXObject) {
    XMLHttpRequestObject = new
     ActiveXObject("Microsoft.XMLHTTP");
  }
        .
        .
        .
}
```

Note also that code that's been omitted has been indicated with three vertical dots. That's all there is to the notation in this book.

Foolish Assumptions

I don't assume that you have knowledge of JavaScript when you start to read this book, but you do have to know JavaScript to understand Ajax. Chapter 2 presents all the JavaScript you'll need in this book.

Also, Ajax often involves some server-side programming, and this book, as most books on Ajax do, uses PHP for that. You won't need to know a lot of PHP here, and what PHP there is is pretty self-explanatory, because it's a lot like JavaScript. However, there's a whole chapter on PHP, Chapter 10, and you can always dip into it at any time.

However, you should have some HTML prowess — enough to create and upload to your server basic Web pages. If you feel shaky on that point, take a look at a good book on HTML, such as *HTML 4 For Dummies,* 5th Edition, by Ed Tittel and Mary Burmeister (published by Wiley).

How This Book Is Organized

Here are the various parts that are coming up in this book.

Part I: Getting Started

Chapters 1 and 2 get you started on your tour of Ajax. Here, you get an overview of how Ajax is used today, and what it has to offer. There are many applications available that use Ajax, and you see a good sampling in this part. Then you get a solid grounding in JavaScript, the programming language Ajax is built on. (If you're already a JavaScript Meister, feel free to skip this material.) To use Ajax, you have to use JavaScript, and in this part, you build the foundation that the rest of the book is based on.

Part II: Programming in Ajax

In Chapters 3 and 4, you delve into Ajax programming for real. Here, you see how to grab data from the server — whether that data is plain text or XML — and how to put that data to work. To illustrate how these techniques work, you see plenty of examples using Ajax, Dynamic HTML to update Web pages without needing a page refresh, and even advanced techniques like connecting to Google behind the scenes for real-time same-page Web searches. At last but not least, you find out how to support multiple Ajax requests to your server at the same time.

Part III: Ajax Frameworks

Ajax can involve a lot of programming involved, and Part III takes a look at some of the many shortcuts that are available. Rather than reinventing the wheel yourself, you can use the Ajax *frameworks.* These frameworks are free and do most of the programming for you, so you'll definitely want to check out this part. You can find all kinds of Ajax techniques, such as using Ajax for drag-and-drop operations, pop-up menus, downloading images behind the scenes, and more.

Part IV: In-Depth Ajax Power

Chapters 8 to 10 give you even more of the Ajax story. Chapter 8 is all about working with XML in JavaScript, and that's what you often do in Ajax. In this chapter, you discover how to deal with XML documents that can get pretty complex, extracting the data you want, when you want it.

Chapter 9 gives you the story on Cascading Style Sheets (CSS), which offer all kinds of options (such as creating pop-up menus) to display the data you fetch from the server using Ajax techniques. Because using Ajax means displaying data in a Web page without a page reload, using CSS is a big part of Ajax programming.

Chapter 10 is about another big part of Ajax programming — writing code for the server so that you can send data back from the server to the browser. Like most Ajax books and Ajax samples you can find on the Internet, this book uses PHP on the server. You won't need to know PHP to read this book, but it'll help when you start using Ajax yourself, so Chapter 10 gives you a foundation in writing and working with PHP.

Part V: The Part of Tens

No *For Dummies* is complete without a Part of Tens. Chapter 11 is all about ten Ajax design issues you're going to run into — and what to do about them. For example, working with web pages interactively, as Ajax does, means that the browser's Back button isn't going to work if the user wants to undo a recent update. You'll find some of the solutions that have been attempted discussed in Chapter 11.

Chapter 12 introduces you to ten essential Ajax resources. Knowing where to find these resources, and the Google groups and Ajax discussions on the Internet, will let you join the worldwide Ajax community.

Icons Used in This Book

You'll find a handful of icons in this book, and here's what they mean:

Tips point out a handy shortcut or help you understand something important to Ajax programming.

This icon marks something to remember, such as how you handle a particularly tricky part of Ajax.

This icon means that what follows is technical, insider stuff. You don't have to read it if you don't want to, but if you want to become an Ajax pro (and who doesn't?), take a look.

Although the Warning icon appears rarely, when you need to be wary of a problem or common pitfall, this icon lets you know.

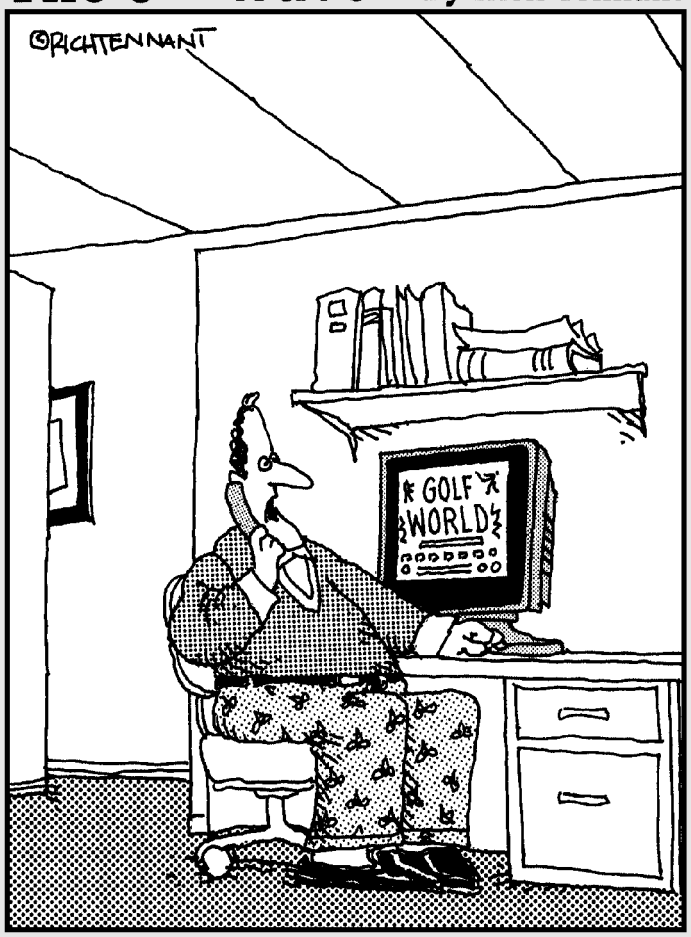
This icon lets you know that there are some pretty cool Web resources out there just waiting for you to peruse. (In fact, one little corner of the Net, `www.dummies.com/go/ajax`, has the code for this book available for free download.)

Where to Go from Here

Alright, you're all set and ready to jump into Chapter 1. You don't have to start there; you can jump in anywhere you like — the book was written to allow you to do just that. But if you want to get the full story from the beginning, jump into Chapter 1 first — that's where all the action starts. (If you're familiar with what Ajax is and are already quick with JavaScript, you might want to flip to Chapter 3 to start tinkering with the code that makes Ajax go.)

Part I
Getting Started

The 5th Wave By Rich Tennant



"I can't really explain it, but every time I animate someone swinging a golf club, a little divot of code comes up missing on the home page."

In this part . . .

This part introduces you to Ajax. You get a guided tour of the Ajax world here, and you get a chance to see how Ajax is used today. A good sampling of Ajax applications are on view in Chapter 1, just waiting for you to check them out for yourself so you can see what Ajax has to offer. From autocomplete and live searches to Google Maps, I pack a lot of Ajax in here. Next comes Chapter 2, which provides the JavaScript foundation that the rest of the book relies on. If you already know JavaScript, feel free to skip that material, but otherwise, take a look. Ajax is built on JavaScript, so you want to make sure you've got all the JavaScript you need under your belt before going forward.

Chapter 1

Ajax 101

In This Chapter

- Introducing how Ajax works
- Seeing Ajax at work in live searches, chat, shopping carts, and more

"We aren't getting enough orders on our Web site," storms the CEO. "People just don't like clicking all those buttons and waiting for a new page all the time. It's too distracting."

"How about a simpler solution?" you ask. "What if people could stay on the same page and just drag the items they want to buy to a shopping cart? No page refreshes, no fuss, no muss."

"You mean people wouldn't have to navigate from page to page to add items to a shopping cart and then check out? Customers could do everything on a single Web page?"

"Yep," you say. "And that page would automatically let our software on the server know what items the customer had purchased — all without having to reload the Web page."

"I love it!" the CEO says. "What's it called?"

"Ajax," you say.

Welcome to the world of Ajax, the technology that lets Web software act like desktop software. One of the biggest problems with traditional Web applications is that they have that "Web" feel — you have to keep clicking buttons to move from page to page, and watch the screen flicker as your browser loads a new Web page.

Ajax is here to take care of that issue, because it enables you grab data from the server without reloading new pages into the browser.

How Does Ajax Work?

With Ajax, Web applications finally start feeling like desktop applications to your users. That's because Ajax enables your Web applications to work behind the scenes, getting data as they need it, and displaying that data as you want. And as more and more people get fast Internet connections, working behind the scenes to access data is going to become all the rage. Soon, it'll be impossible to distinguish dedicated desktop software from software that's actually on the Internet, far from the user's machine. To help you understand how Ajax works, the following sections look at Ajax from a user's and a programmer's perspective.

A user's perspective

To show you how Ajax makes Web applications more like desktop applications, I'll use a simple Web search as an example. When you open a typical search engine, you see a text box where you type a search term. So say you type Ajax XML because you're trying to figure out what XML has to do with Ajax. Then, you click a Search the Web button to start the search. After that, the browser flickers, and a new page is loaded with your search results.

That's okay as far as it goes — but now take a look at an Ajax-enabled version of Yahoo! search. To see for yourself, go to `http://openrico.org/rico/yahooSearch.page`. When you enter your search term(s) and click Search Yahoo!, the page doesn't refresh; instead, the search results just appear in the box, as shown in Figure 1-1.

Figure 1-1: An Ajax-enabled Yahoo! search.

That's the Ajax difference. In the first case, you got a new page with search results, but to see more than ten results, a user has to keep loading pages. In the second case, everything happens on the same page. No page reloads, no fuss, no muss.

You can find plenty of Ajax on the `http://openrico.org` Web site. If you're inclined to, browse around and discover all the good stuff there.

A developer's perspective

In the article "Ajax: A New Approach to Web Applications" (`www.adaptivepath.com/publications/essays/archives/000385.php`), Jesse James Garrett, who was the first to call this technology Ajax, made important insights about how it could change the Web. He noted that although innovative new projects are typically online, Web programmers still feel that the rich capabilities of desktop software were out of their reach. But Ajax is closing the gap.

So how does Ajax do its stuff? The name *Ajax* is short for Asynchronous JavaScript and XML, and it's made up of several components:

- Browser-based presentation using HTML and Cascading Style Sheets (CSS)
- Data stored in XML format and fetched from the server
- Behind-the-scenes data fetches using `XMLHttpRequest` objects in the browser
- JavaScript to make everything happen

JavaScript is the scripting language that nearly all browsers support, which will let you fetch data behind the scenes, and XML is the popular language that lets you store data in an easy format. Here's an overview of how Ajax works:

1. In the browser, you write code in JavaScript that can fetch data from the server as needed.
2. When more data is needed from the server, the JavaScript uses a special item supported by browsers, the `XMLHttpRequest` object, to send a request to the server behind the scenes — without causing a page refresh.

   The JavaScript in the browser doesn't have to stop everything to wait for that data to come back from the server. It can wait for the data in the background and spring into action when the data does appear (that's called *asynchronous* data retrieval).

3. The data that comes back from the server can be XML (more on XML in Chapters 2 and 8), or just plain text if you prefer. The JavaScript code in the browser can read that data and put it to work immediately.

That's how Ajax works — it uses JavaScript in the browser and the `XMLHttpRequest` object to communicate with the server without page refreshes, and handles the XML (or other text) data sent back from the server. In Chapter 3, I explain how all these components work together in more detail.

This also points out what you'll need to develop Web pages with Ajax. You'll add JavaScript code to your Web page to fetch data from the server (I cover JavaScript in Chapter 2), and you'll need to store data and possibly write server-side code to interact with the browser behind the scenes. In other words, you're going to need access to an online server where you can store the data that you will fetch using Ajax. Besides just storing data on the server, you might want to put code on the server that your JavaScript can interact with. For example, a popular server-side language is PHP, and many of the examples in this book show how you can connect to PHP scripts on Web servers by using Ajax. (Chapter 10 is a PHP primer, getting you up to speed on that language if you're interested.) So you're going to need a Web server to store your data on, and if you want to run server-side programs as well, your server has to support server-side coding for the language you want to work with (such as PHP).

What Can You Do with Ajax?

The technology for Ajax has been around since 1998, and a handful of applications (such as Microsoft's Outlook Web Access) have already put it to use. But Ajax didn't really catch on until early 2005, when a couple of high-profile Web applications (such as Google Suggest and Google Maps, both reviewed later in this chapter) put it to work, and Jesse James Garrett wrote his article coining the term Ajax and so putting everything under one roof.

Since then, Ajax has exploded as people have realized that Web software can finally start acting like desktop software. What can you do with Ajax? That's what the rest of this chapter is about.

Searching in real time with live searches

One of the truly cool things you can do with Ajax is live searching, where you get search results instantly, as you enter the term you're searching for. For example, take a look at `http://www.google.com/webhp?complete=1&hl=en`, the page which appears in Figure 1-2. As you enter a term to search